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of brick, so placed as to leave as much air space as possible under the muffle and yet support the floor.

Fig. 4 shows the front elevation of the kiln, K being the opening into the muffle. The bricks are set loosely in this opening, so that they can be removed when the kiln is to be charged. When the kiln is charged, they are replaced and plastered over with fire clay. A is the fire opening. The bricks above it are supported by a strip of iron about three-sixteenths of an inch thick and one and a half to two inches wide.

Fig. 5 is a vertical section at B B (Fig. 1), showing shape of the muffle M M, and the air spaces around it through which the heat draws. Owing to the thinness of the bricks composing the muffle, it is well to extend a few bricks through from the outside wall to give support to the walls of the muffle.

Fig. 6 is a vertical section at D D (Fig. 1), showing the longitudinal form of the muffle and the location of the chimney. The opening of the chimney should be about five inches in diameter. It should be built of brick to a height of about two feet, and extended beyond that with sheet-iron pipe to a height of at least five feet above the bricks.

After the kiln is completed, as shown in these plans, it is well to inclose it in one or even two layers of common, cheap brick, set in mortar.

The fuel used is kerosene. It is burned in a pan placed in the fireplace. The pan is fed by a pipe three or four feet in length and about one-quarter or three-sixteenths of an inch bore, having a funnel at its outer end into which a small stream of oil flows from a tank fitted with a small faucet.

The supply tank is placed above and somewhat to the side of the fire opening, the pipe being bent to fit location.

The pipe should enter the fire-pan at the edge and not from above, to avoid heating the oil in the pipe too much.

# PHYSICAL TRAINING.

CARL J. KROH.

The endeavor during the present quarter will be to promote a stronger realization of the more immediate purposes of physical training by enhancing individual proficiency. To this end, the work of the various student classes will be brought into closer relation through a study of work adaptation on the basis of definite class aims, as indicated in the Course of Study, Vol. I, No. 2. Skill in illustrating and conducting, on this basis, prescribed lessons, and lessons outlined by the students themselves, will determine priority with reference to teaching qualifications.

The regular class periods will be devoted exclusively to the practical aspects of the training, *i. e.*, to the study of the respective practice orders and to gymnastic practice. Work adaptation will conform to the general plan of gradation and group arrangement of students. Students qualifying as group teachers will be assigned special work.

The theoretical work will be distinct from the regular practice, and problems arising with reference to subject-matter, and in discussions, will be referred to section and committee conferences for special study and report.

In this way it is hoped to obviate the restrictions imposed by the limitations of the regular schedule, and to facilitate the practical work, and also to obtain a more thorough consideration of the problems suggested in the COURSE OF STUDY.

# OUTLINE FOR JANUARY.

Planning of class-room and gymnasium practice orders, representing general and specific lesson content, adapted to the different grades. Considerations with reference to progress. Critical study of points in effective training, with especial reference to class aims suggested in the outlines, Vol. I, No. 2. Specific aims, correction of postural defects. Means: selection, construction, sequence, and co-ordination of subject-matter. Values: adaptation, form, and technique of execution. Methods: illustration, direction; terminology, commands. Results: effects of training and instruction upon growth, the will, and intelligence. Comparisons of the work and play of groups and classes.

# WINTER GAMES AND SPORTS.

#### HOCKEY.

The spirit of the game of hockey is pretty much the same as that of football, the object being to strike a ball through a goal marked by two uprights 4 feet high and 6 feet apart. The principal difference is that the instrument of propulsion is a light, hooked stick, or "hockey" (of some tough wood, as ash, and about the length of a cane), instead of the foot, and that the ball is of solid India rubber and about 2½ inches in diameter. A twine ball, or a cloth ball, is preferred by some players. A field about 75 to 100 yards long, and about 30 to 40 yards wide, marked by goals near the end, as in football, and by flags at the sides, will accommodate about twelve players on each side without dangerous crowding during play.

Good players drive the ball along by a succession of taps, and guide it in and out between the opposing groups of hockeys by a mere play of the wrists, scarcely ever lifting or swinging the hockey above the shoulders.

The play is governed by the following rules: (1) The choice of goals shall be decided by tossing, and the side winning the toss shall start the ball from a spot 10 yards in front of its own goal. (2) The ball shall be played with the hockey; it shall, however, be lawful to stop the ball with the body or the legs, but not with the hands. (3) A goal is gained when the ball is played through between the posts and under the cord by the opposing party, or in any way passed through by the side owning the goal. (4) No player shall strike the ball back-handed; in every case the player must play facing the opponent's goal. (5) A player is not permitted to loiter near the adversary's goal, but may be required to retire, when not playing the ball, to a distance of at least 25 yards. (6) The side scoring the greatest number of goals in a given time wins the game.

The respective sides must be captained. A referee shall adjust all disputes over points not covered by the rules, appoint the goal umpires, or keepers, one from each side, control the timekeepers, and keep the score.

#### ICE HOCKEY.

The game of ice hockey is played by designating a "home" some 50 feet square, in which one party of players strives to keep the puck, while the other party of players strives to drive it as far away as possible from the home to a distance agreed upon, or to another home. Or the skating surface may be divided by a center line, with additional lines 10 or 15 yards from each side of the center line. The toss of a coin decides on which side the ball is to be dropped by the respective leaders. In beginning, the players of both parties form a circle around the ball, players of both sides alternating. When all is ready, the command to start is given by the leader of the party having the ball on its side. Goals may be fixed at a distance from 30 to 60 yards from the center line.

#### CURLING.

A curling surface consists of a smooth stretch of ice about 100 to 125 by 25 feet. Near the ends of this stretch a mark, called a "tee," is placed. Around the tee as a center is drawn a circle about 14 feet in diameter, leaving a margin of about 6 feet between it and the end line of the field. Two smaller circles, respectively 8 and 4 feet in diameter, are marked within this circle. The space thus marked is called the "hoose." About a dozen feet or so behind the tee and to the left of the center line of the stretch another smaller circle, about 2 feet in diameter, is drawn for the standing start of the players. To count a "put" or "swing," one foot must be kept within this circle.

The playing is done with large-sized stones — flattened spheres — weighing from fifteen to thirty and more pounds, which are provided with handles, and are highly polished so as to be very smooth (see models, sporting goods departments, down town). The players, each provided with two stones, take their places at the sides of the respective tees and start the stones in proper

order down toward the other tee. A stone put on or within the outer circle counts one; on or within the next circle, two; to strike a tee counts one; to displace it beyond the outer circle, two; a stone failing to pass into the hoose does not count. In competitive games various ways of scoring are devised according to the skill of the players (see rules, National Curling Club, New York).

Teams usually consist of four pairs. Each player puts a stone alternately with his opponent until both stones are played. The proper rotation of players is maintained by the leader of the game, who is known as the "skip." Games are played for a specified time or a certain number of shots.

An amusing feature of the game is the "sweeping." The players, after delivering their stones, quickly grasp their "sweeps," or brooms, and brush away the particles of ice from the path of a moving stone, in order that it may glide a longer distance. If a stone shows a sign of weakness, and there is doubt as to whether it can reach the hoose, the players begin to sweep for dear life to "coax" the stone toward the tee. To this end the skip directs them to keep beyond the center of the stretch. The moment it passes the tee the other side may sweep it out of the hoose if it can. The sweepers become very expert and not infrequently bring a stone to a standstill at just the right place.

#### OUTHOPPING GAMES - FOOT-IN-THE-RING.

After an energetic lesson in gymnastics, the participants are arranged around a plainly marked chalk ring, two feet in diameter, standing, sitting, or lying down. One of them, selected to begin the game, stands in a stride or lunging position, with the forward foot placed in the ring, arms crossed abreast; another player attempts to dislodge him by adroit attacks, feinting and pushing, hopping on one foot, arms abreast. The center player evades all attacks by constantly moving out of reach, dodging, bending, jumping, suddenly facing about, etc., without meeting any attacks with counter-attacks. Both players may use all fair artifices to defeat each other; however, kicking or tripping bars a player from the game. The player in the ring loses when displaced; the other upon touching the floor with both feet simultaneously. Good players may defy two parties attacking from opposite sides.

When the game is played outdoors, from five to eight players may stand within a circle formed by from twenty-five to thirty boys. These players, hopping on one foot, attempt to oust one of their number, previously designated, from the circle. The player thus attacked seeks to evade all individual or concerted action by running and dodging. When he is forced out of the circle, a new set of players enter, and so on until the whole class, in turn, has been in the ring. The "hoppers" must keep their arms abreast and at no time use their hands, simply pushing with their shoulders.

#### APPARATUS GYMNASTICS.

(For reference throughout the year.)

#### POLES, ROPES.

Apparatus.—Eight hanging poles, 16 to 20 inches apart. (Height: 10 to 18 feet; diameter: 13/4 inches; material: yellow pine wood.)

Class formation. — As many files of six or eight pupils in "flank order" as pieces of apparatus; arm length's distance between pupils.

Marching order. — Pupils leave head of files to approach apparatus, the class stepping forward one or two steps with each succession upon the command "March," and align rear of files close of exercise.

#### PRELIMINARY EXERCISES.

Executed in class order. Arm movements "upward" are executed in the direction "forward."

Raise arms backward (shoulders back)—begin! 1, 2!

Swing arms upward—begin! 1, 2!

Raise arms backward, swing upward and lower—begin! 1, 2, 3!

Raise heels—begin! 1, 2! (Hands on hips.)

Bend knees - begin! 1, 2!

Raise heels, bend knees (trunk erect), and straighten to "fundamental" position—begin! 1, 2, 3!

Raise arms backward and bent-knee position—stand! Swing arms upward and on tip-toes (quick knee-straightening movement)—stand! Arms and heels—down! Begin! 1, 2, 3!

(The series is executed without halting between exercises.)

(Add to second movement of last exercise: Upward springing movement [body—legs—fully extended]; alight to bent-knee position, etc., 1-4.)

I.

Spring upward to hang-support position (arms extended), right hand uppermost—1, 2! Down!<sup>1</sup>

The first eight pupils advance upon the command "March!" At "one" bent-knee position on tip-toe with arms raised backward is taken; at "two" the pupils swing arms upward and spring to hang position to grasp the poles as high as they can reach. The body hangs fully extended, legs and feet firmly closed, head erect. Upon the command "Down!" the pupils alight to bent-knee position (poles still grasped) and resume fundamental standing position. Or, command "one" for position on tip-toe, "two" for bent-knee position with arms raised backward, and "three" for hang position, "four" for the landing, and "five" for the standing position. Upon the command "March!" the pupils face about and return to their places, passing left

<sup>1</sup> Beginners may advance to the poles—grasping as high as they can reach from the standing position on tip-toe—and place one foot or leg against the poles from the rear by raising the knee, and spring from the other foot, carrying the same in front of the pole to "hang-support position with foot-grasp"

flanks of files, the next rank in order advancing, the class taking one or two steps forward—as needed, to recover position.

Same, with foot-grasp, left leg (foot) front, right leg (foot) rear of pole, left hand uppermost—1, 2! Foot-grasp—change! Down!

(The foot-grasp should be close, with feet [ankles] firmly clasped around the poles and extended downward.)

Hanging position, foot-grasp, arms bent—I, 2! Arms—stretch! Down! Hanging position, foot-grasp, arms extended—I, 2! Knees—raise! (Knees are raised as high as possible without bending the arms.) Stretch! Down!

Hanging position, foot-grasp — I, 2! Arms — bend! Stretch! Down! Hanging position, foot-grasp — I, 2! Arms — bend! Knees — raise! Knees — stretch! Arms — stretch! Down!

II.

# Foot-grasp.

Spring to hanging position—I, 2! Arms—bend! Change foot-grasp, knees—raise! Change foot-grasp, knees—stretch! Arms—stretch! Down!

Hanging position—1, 2! Arms—bend! Change hand-grasp (other hand uppermost) and knees—raise! Arms and knees (hand-grasp as at first)—stretch! Down!

Hanging position, arms bent—1, 2! Knees—raise! Change hand-grasp upward repeatedly, uppermost hand leading, until body is extended—begin! (Support body by holding the feet in position—foot-grasp firm, without slipping.) Down!

Hanging position, arms bent—1, 2! Knees—raise! Extend body upward by changing hand-grasp, hand-over-hand—begin! Lower body (foot-grasp firm) by changing hand-grasp downward—begin! Legs—stretch! Down!

Hanging position, arms bent and knees raised—1, 2! Extend body upward by grasping upward simultaneously with both hands—begin! Down!

Repeat last exercise, changing grasp of hands (left and right hands uppermost alternately) during upward movement—begin! Down!

III.

# Hang-support position with foot-grasp -1, 2.

Arms — bend! Knees — raise! Knees — stretch! Arms — Stretch! Repeat! Down!

Bend arms and raise knees (and stretch) simultaneously—begin! Halt! Down!

Bend arms and knees—raise! Grasp upward with both hands simultaneously until the body is fully extended—1, 2! Bend arms and knees—raise! Repeat upward extension, arm-bending and knee-raising, until the top of the pole is reached. Down! [Grasp as low as possible with both

hands (below the chest), bending body sharply (hips and knees—foot-grasp firm)—1; lower the body (fullest extension)—2; repeat downward grasp (with foot-grasp firm) and body extension downward, till the floor is reached.]

Repeat exercise, changing foot-grasp.

Repeat exercise, circling around the pole (without change of foot-grasp). Down!

Repeat exercise, grasping upward with left hand leading.

Repeat exercise, right hand leading in each upward grasp.

Repeat exercise, with hands leading alternately.

(Downward movements correspond to upward movements.)

IV.

Hanging position (without foot-grasp), legs in full-stride position outward —1, 2! Bend arms—begin! Halt! Down!

Hanging position, foot-grasp—1, 2! Climb upward, hand-over-hand, right hand leading—begin! In full-stride position outward, hand-over-hand—down!

Hanging position, foot-grasp—1, 2! Climb upward, hand-over-hand—begin! In full-stride position outward, grasping downward with both hands simultaneously—down!

Hanging position, legs in full-stride position outward—1, 2! Climb upward, hand-over-hand—begin! Glide downward with foot-grasp (slowly), grasping downward with both hands simultaneously—begin!

Hanging position, legs together—1, 2! Climb upward, hand-over-hand—begin! Glide downward with foot-grasp, left and right hands grasping downward alternately (below chest)—begin!

Same, but glide downward with left hand on hip, grasping with right hand. Same, but glide downward with both hands on hips (or arms extended outward, etc.)—begin! (Body is held erect, close to the poles.)

#### TABLES OF GROWTH.

FRANCES MUSSELMAN, CAROLINE CRAWFORD.

The following studies and records of size and growth for age and sex are given as a suggestive outline for the teacher to use in studying the development of the child.

The tables compiled in America are placed together to bring out the variations found by the different investigators in the various parts of the country.

The most important study from these tables for the teacher is the observation of the normal annual increase in growth. While a child may be below or above an average size, yet the normal annual increase in development remains, in relation to

that size, fairly constant. A falling below the normal growthrate is often the first indication of a weakened physical condition, which may mean a failure to keep up with the grade, or, may be, even the graver sign, susceptibility to disease. An overgrowth annually may be the first indication of the sluggishness produced by the great amount of energy used in building the body. This must necessarily be at the expense of its action, unless the power of functional development is also far beyond the normal.

As the normal growth must be taken into account in preparing the school course, so the abnormal development, or the lack of development, should also be a guide as to the variation necessary in that prescribed course of study.

The tables of Porter are made from measurements of St. Louis school children; those of Bowditch, of Boston children (first column includes all nationalities, second column American); those of Christopher are made from Chicago children of American parentage; and the tables of Sargent include children from various parts of the country.

The height, standing, is taken without shoes. The weight, except in the Sargent measurements, includes the clothing.

The records are in centimeters and kilograms. To change centimeters to inches, divide by two and one-half. To change kilograms to pounds, multiply by two and one-fifth.

HEIGHT, STANDING.
(Centimeters.)

#### Boys. GIRLS. Christopher Bowditch Bowditch Sargent, 48.1 Birth... Birth . . . 49.3 73.8 84.5 1 yr . . . . τ yr .... 74.I 82.3 2 yrs . . . 92.6 90.7 98.2 8,001 97 IOI.I 105.8 103.9 106.2 107.1 . . . 103.2 105.2 105.7 106.7 108.1 108.3 113.8 112.7 117.8 100.2 109.3 111.7 110,2 110.7 111.4 114.2 114.4 114.3 116.4 117.7 118.3 7 113.4 115.9 117 119.7 121.5 r18.9 121 124.8 125.8 124.2 126.4 127.1 128.2 126.2 128.8 136 128.3 131.8 132.5 129.4 129.2 131.4 132.6 132.9 130.7 135.6 137.5 138.2 138.9 134.4 138.5 140 133.6 133.5 135.7 137 ٠.. 133.3 12 137.7 145.2 130.5 139.7 141.9 143 144 147.5 140 141.4 143.7 13 149.6 147.6 146.1 148.3 153.2 145.4 150.1 152.5 143 144.7 150 13 157.5 151.9 155.8 158 149.8 152.9 153.6 156 156.2 151.4 158.4 166 154.3 160.4 149.7 157.4 165 155.5 156.4 15 16 155.2 15 157.5 167.7 171.6 157.5 156 167.5 159 160 158.3 166 168.2 17 159.4 157.9 171.9 T60.6 169.6 169.6 170.5 172.4 159.5

WEIGHT.

# (In kilograms.)

Boys.							Girls.							
Age.	Porter.	Rotch.	Bowditch.	Bowditch.	Christopher.	Sargent.	Age.	Porter.	Rotch.	Bowditch.	Bowditch.	Christopher.	Sargent.	
Birth t yr 2 yrs 3 4 5 6 7 8 9 10 11 12 13 13 14 14	19.8 21.6 23.8 26.2 28.3 31 33.4 36.2	3.25 9.5 13.8 15.9 17.2 18.6 20.4 22.2 24.4 26.8 29.6 31.8 38.4 42.9	18.5 20.4 22.1 24.3 26.7 29.5 31.6 34.3 37.6	18.5 20.4 22.4 24.5 26.9 30.1 32.4 35.4 38.8	 16.6 17.9 20.6 22.3 24.9 26.9 29.6 32 41.3 46.8	29.3 30.7 34 38.5	Birth  1 yr  2 yrs  3  4  5  6  7  9  10  11  12  13	18.9 20.8 22.8 25 27.4 29.8 33.2 38 42.6	3.15 9 13.3 15.5 17.9 19.6 21.5 23.4 25.9 28.2 31.2 35.5 40.2	17.9 19.5 21.4 23.3 25.6 27.8 30.6 34.9 39.9	17.9 19.7 21.6 23.8 25.7 28.4 31.1 36.2 41.2	15.3 18.2 19.6 21.2 24.5 27.2 29.1 31.8 35.5 41.2	28.2 31.7 35.5 40.6	
14 15 16 17 18	39.9 45.4 51.8 55.3		48 55 57 · 4 59 · 7	44.2 50.2 55.9 57.8 59.5	49.6 50.8	50.7 60 61 61.2	14 15 16 17 18	46.8 49.9 52.5 53.1		44.3 47.6 50.4 52.1 51.1	45.3 48.6 51.1 51.5 51.4	47·3 48.9	46.5 49.2 50.8	

# ANNUAL INCREASE IN HEIGHT.

# (In centimeters.)

Boys.							Girls.							
Age.	Porter.	Rotch.	Bowditch.	Bowditch.	Christopher.	Sargent.	Age.	Porter.	Rotch.	Bowditch.	Bowditch.	Christopher,	Sargent.	
Birth 1 yr 2 yrs 3 4 4 5 5 6 6 7 7 8 9 9 11 12 13 3 14 4 15 5 16 6 17 7 18 8 17 7 18 8	5.2 5.3 5.1 4.6 5 4.1 4.7 6.4	24.5 10.7 8.1 5.6 4.7 5.4 5.1 4.8 5.1 4.4 5.3 6.7	5.6 5.1 4.9 5.4.2 4.4 4.7 7.6	5.5 5.4 5.5 4.4 5.5 4.9 6.2 7.3	6.2 3.7 4.1 6.2 3.7 4.3 5.5 5.5 7.8 3.6	4 5.2 4.5 7.5 6.6	Birth 1 yr 2 yrs 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 16 17 18 18	5.3 5.3 5.3 4.7 4.7 5.6 6.6 5.7 3.8 2.2	26 8.1 8.4 6.2 6.2 5.1 5.4 5.1 4.4 9.5 2 6.1 5.7	55.7 5.11 4.89 56.2 6.46 4.60	56.35556.35556.35445	5.6 5.1 4.6 5.4 4.7 5.1 5.7 7 .2	4 5.: 4.: 7.:	

#### ANNUAL INCREASE IN WEIGHT.

(In kilograms.)

	GIRLS.											
Age.	Rotch.	Bowditch.	Bowditch.	Christopher.	Sargent.	Age.	Porter.	Rotch.	Bowditch.	Bowditch.	Christopher.	Sargent.
I yr       2 yrs       3       4       5       6       7       10       2       11       2       12       2       13       2       14       3       15       5       6       6       7       10       2       11       2       12       2       14       3       15       6       6	6.2 4.2 1.3 1.8 .8 1.7 1.2 2.2 2.3 2.4 1.3 3 3 3 3 3 4.4 1.5 4.4	   1.9 1.7 2.2 2.4 3.8 2.1 2.7 3.4.6 5.8 7	  1.9 2.1 2.4 2.3 3.4 5.4 5.7 1.9	1.3 2.7 1.7 2.6 2 2.7 2.4 4 5.3 5.5 5.8 1.2	    1.4 3.3 4.5 6.1 9.3	Birth 1 yr 2 yrs 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 16 17 18	1.8 2 2.1 2.4 2.3 3.4 4.7 4.6 4.2 3.1 2.5	5.8 4.3 1.7 1.4 1.4 1.8 1.9 2.4 2.3 4.6 4.4*	1.6 1.9 1.9 2.3 2.8 3.3 5 4.4 3.3 2.8	  1.8 1.9 2.2 1.9 2.5 5.1 5.1 5.4 4.1	2.9 2.4 1.6 3.3 2.7 1.9 2.7 5.7	3.8

# KINDERGARTEN THEORY.

#### BERTHA PAVNE.

# REVIEW FOR NOVEMBER AND DECEMBER.

THE work for November and December has been centered about the work in the kindergarten, and has dealt chiefly with stories, songs, and handwork.

From nursery rhymes and *Mother Goose* we went to the old fairy tales, as models of charm both in imagery and plot. The kindergarten plan caused us to look for good stories of home life and household industries. Those that were selected for our own use are given below. Thanksgiving and Christmas time brought the need of stories to emphasize some phase of these festivals. Stories related outwardly to Thanksgiving were found to be especially poor in number and quality. This search for stories related to the season, approaching festivals, or the work of the group aroused the following questions:

- 1. Is the primary function of these stories to bring knowledge of certain facts, or to enhance such knowledge already gained; to instruct, or to deepen the sense of values?
- 2. In general, should a story so related come first or last in the consideration of a subject?